

1. APPROACH LIGHTING SYSTEMS. An approach lighting system is a configuration of signal lights disposed symmetrically about the extended runway centerline starting at the landing threshold and extending outward into the approach zone. Several systems are designed with rows of lightbars, wing lightbars, and distinguishable crossbars to provide visual cues for runway alignment, height perception, roll guidance, and horizon references. Some systems are augmented with a single row of flashing lights aligned on the extended runway centerline. When a single row of flashing lights is employed as an independent system, only the runway alignment cue is provided. At civil airports, systems used in conjunction with precision approaches (such as an ILS) shall be a minimum length of 2,400 feet at locations which have a glide slope of 2.75° or higher. Locations which have a glide slope less than 2.75° require a 3,000 foot system. For nonprecision approaches, the systems are 1,400 feet. Detailed configurational layouts and specifications are depicted in FAA Handbooks 6850.2 and 6850.5 for U.S. standard installations. For military airports, see applicable service directives.

a. Sequenced Flashers. Those approach lighting systems designated with flashing lights are augmented with a system of sequenced flashing lights. Such lights are installed at each centerline bar normally starting 1,000 feet from the threshold out to the end of the system. These lights emit a bluish-white light and flash in sequence toward the threshold at a rate of twice per second.

b. RAIL. Runway Alignment Indicator Lights. RAIL consists of sequenced flashing lights installed on the extended runway centerline beyond the associated approach lighting system. The first light is located 200 feet from the lightbar farthest from the runway threshold. Successive units are spaced 200 feet apart outward into the approach zone for a specified distance.

2. NONSTANDARD SYSTEMS. Approach lighting systems other than the U.S. standard installations may be considered equivalent to the

standard systems for the purpose of formulating minimums authorized for military procedures, provided requirements of paragraph 344 are met. This appendix illustrates several non-U.S. standard systems and is offered as a guide to the determination of equivalency.

3. ALSF-1 (Type A₁)*. Approach Lighting System with Sequenced Flashing Lights, Category I Configuration.

a. System Description. The category I ALSF (ALSF-1) consists of a centerline lightbar approximately 13 1/2 feet long with five equally spaced lights at each 100-foot interval, starting 300 feet from the runway threshold and continuing out to 2,400 or 3,000 feet from the threshold. The centerline lightbar at 1,000 feet from the threshold is 100 feet long and contains 21 lights. All of the aforementioned lights are white. The lightbar 200 feet from the threshold is 50 feet long, contains 11 red lights, and is called the terminating bar. Two lightbars, each containing five red lights, are located 100 feet from the threshold, one on either side of the centerline, and are called wingbars. A row of green lights on 5-foot centers is located near the threshold and extends across the runway threshold and outwards a distance of approximately 45 feet from the runway edge on either side of the runway. See Figure 134.

b. Equivalent Systems. When the characteristics described in paragraph 3a exist in the following systems, the appropriate visibility reductions may be applied to MILITARY instrument approach procedures and FAR 121 operations at foreign airports.

Type* Description

- B U. S. Configuration B
- * BN Former NATO Standard C
- BP NATO Standard *
- J Calvert (United Kingdom)
- O Centerline High Intensity (Europe)
- T Centre Row DOT Standard High Intensity (Canada)

Appendix 5

*NOTE: "Type" refers to the system identification letters assigned to approach lighting as shown in the Interagency Air Cartographic Committee (IACC) Specification IACC No. 4. These identification letters are shown on the Approach Lighting Legend Sheets published with Civil and Military Instrument Approach Procedures.

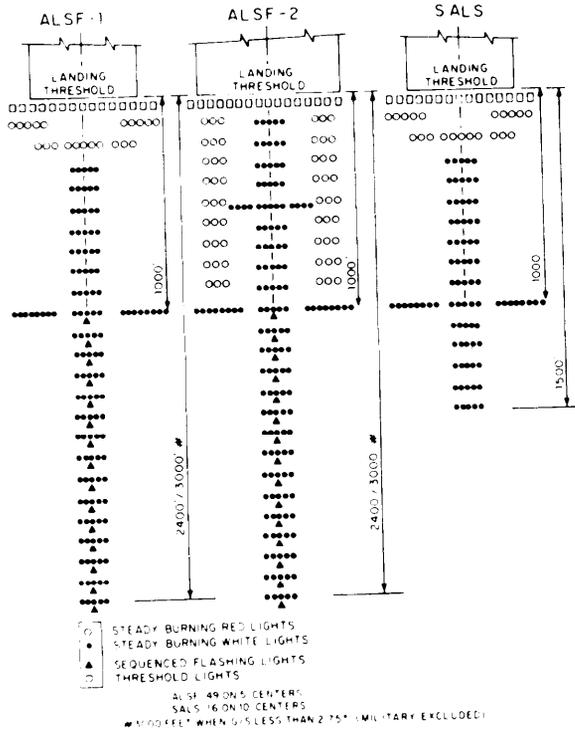


Figure 134. APPROACH LIGHTING SYSTEMS.

4. ALSF-2 (Type A). Approach Lighting System with Sequenced Flashing Lights.

a. System Description. The category II ALSF (ALSF-2) differs from the category I configuration only in the inner 1,000 feet (nearest the threshold) of the system. The outer 1,400 or 2,000 feet of both systems are identical. The 2,400-foot system is authorized by Order 6850.9

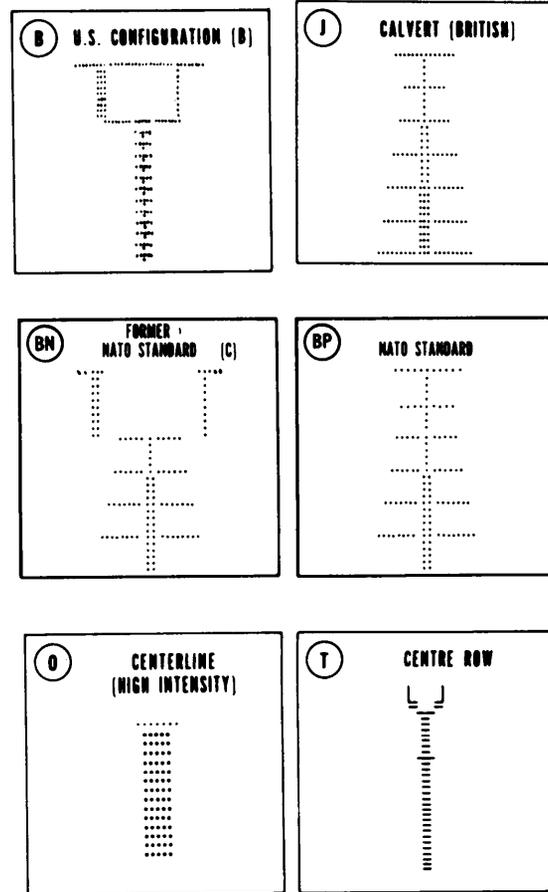


Figure 135. SYSTEMS EQUIVALENT TO U.S. STANDARD A, ALSF-1.

when the glide slope angle is 2.75° or higher, while the 3,000-foot system is authorized when the glide slope angle is less than 2.75°. The terminating bar and wingbars of the category I configuration are replaced with centerline bars of five white lights each. In addition, there are lightbars (three red lights each) on either side of the centerline bars at each light station in the inner 1,000 feet. These are called siderow bars. Also there is an additional bar 500 feet from the threshold. These lights form a crossbar referred to as the 500-foot bar. The category II configuration is shown in Figure 134.

b. Equivalent Systems. None.

*** 5. SALS. (Type A₂) Short Approach Light System.**

a. System Description. The Short Approach Light System is an installation which consists of the inner 1,500 feet of the standard ALSF-1 TYPE A₁ described in paragraph 3 of this appendix. The system provides roll guidance, a distinctive marker at 1,000 feet from the threshold, and distinctive threshold. See Figure 134.

NOTE: SALS is programed to be phased out or retrofitted.

b. Equivalent Systems. When the characteristics described in paragraph 5a exist in the following systems, the appropriate visibility reductions may be applied to MILITARY instrument approach procedures and to FAR 121 operations at foreign airports. See Figure 136.

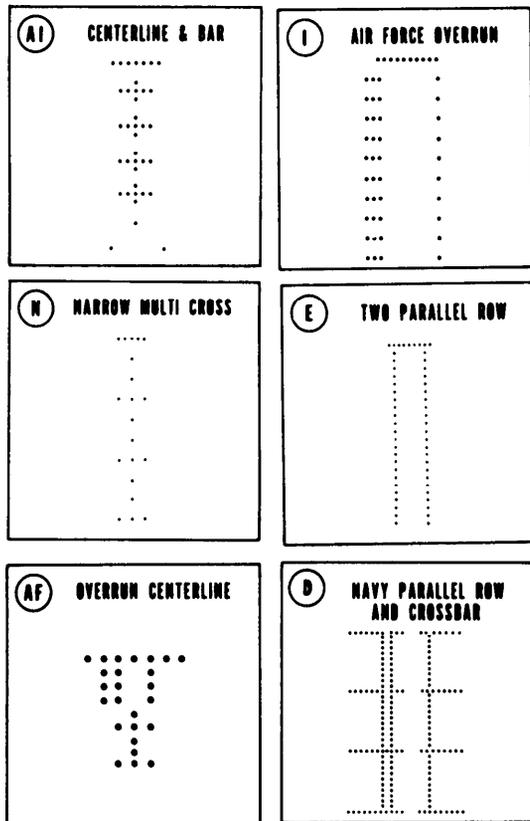


Figure 136. SYSTEMS EQUIVALENT TO SALS, SSALS, SSALF, MALS, AND MALSF.

Type Description

- AI Centerline and Bar (South America)
- I Air Force Overrun (U.S.)
- N Narrow Multi-Cross (British)
- E Two Parallel Rows (U.S.)
- AF Overrun Centerline High Intensity (Europe)
- D Navy Parallel Row and Crossbar (U.S.)

6. SSALS, SSALF, and SSALR. (Type A₃). Short Simplified Approach Lighting System; Short Simplified Approach Lighting System with Sequenced Flashers; and, Short Simplified Approach Lighting System with Runway Alignment Indicator Lights, respectively. See Figure 137.

NOTE: SSALS and SSALF are being phased out.

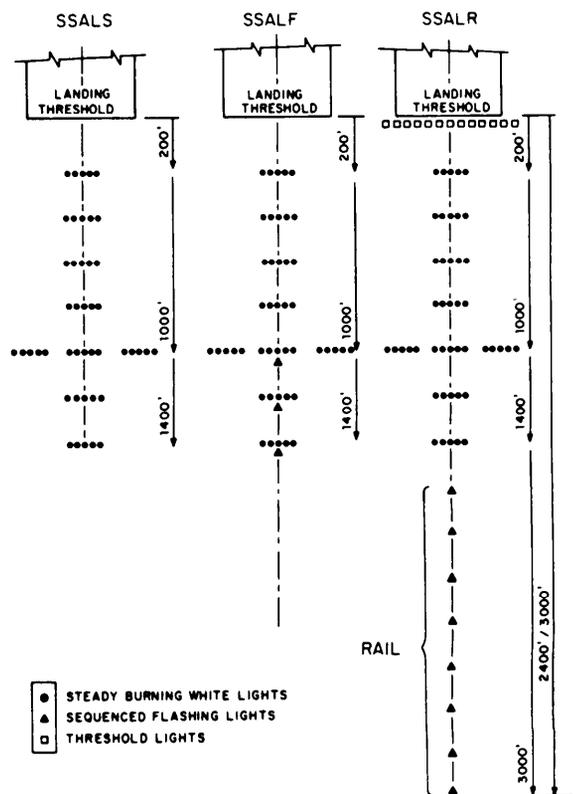


Figure 137. SIMPLIFIED SHORT APPROACH LIGHTING SYSTEMS

Appendix 5

a. Systems Description.

(1) **SSALS.** The SSALS consists of seven five-light bars located on the extended runway centerline with the first bar located 200 feet from the runway threshold. Two additional five-light bars are located one on each side of the centerline bar, 1,000 feet from the runway threshold, forming a crossbar 70 feet long. All lights of the system are white.

(2) **SSALF.** The SSALF consists of a SSALS with three sequenced flashers that are located at the last three lightbar stations.

(3) **SSALR.** The RAIL portion of the SSALR consists of five or eight sequenced flashers located on the extended runway centerline. The first flasher is located 200 feet from the approach end of the SSALS with successive units located at each 200-foot interval out to 2,400 or 3,000 feet from the runway threshold.

b. Equivalent Systems.

(1) **SSALS and SSALF.** When the characteristics described in paragraphs 6a (1) and (2) exist in the systems shown in Figure 136, the appropriate visibility reduction may be applied to **MILITARY** instrument approach procedures.

(2) **SSALR.** When the characteristics described in paragraphs 6a (1) and (3) exist in the systems shown in Figure 138, the appropriate visibility reduction may be applied to **MILITARY** instrument approach procedures.

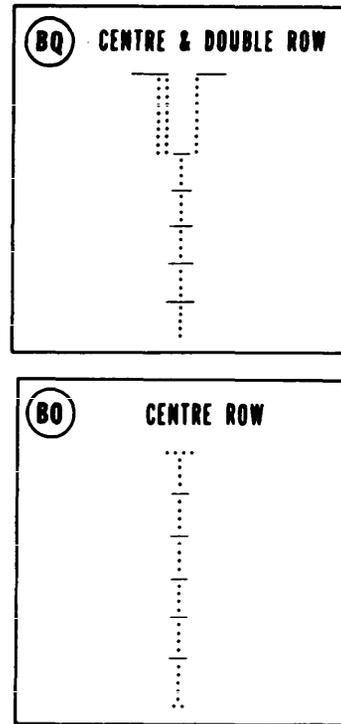


Figure 138. SYSTEMS EQUIVALENT TO SSALR AND MALSR.

Type Description

- BQ Centre and Double Row RCAF Standard (Canada)
- BO Centre Row Modified Calvert (Canada)

7. **MALS, MALSF (Type A₄), and MALSR (Type A₅).** Medium Intensity Approach Lighting System; Medium Intensity Approach Lighting System with Sequenced Flashers; and, Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights, respectively. See Figure 139.

a. Systems Description.

(1) **MALS.** The MALS consists of seven five-light bars located on the extended runway centerline with the first bar located 200 feet from the runway threshold and at each 200-foot interval out to 1,400 feet from the threshold. Two additional five-light bars, one on each side of the centerline bar, 1,000 feet from the runway threshold form a crossbar 66 feet long.

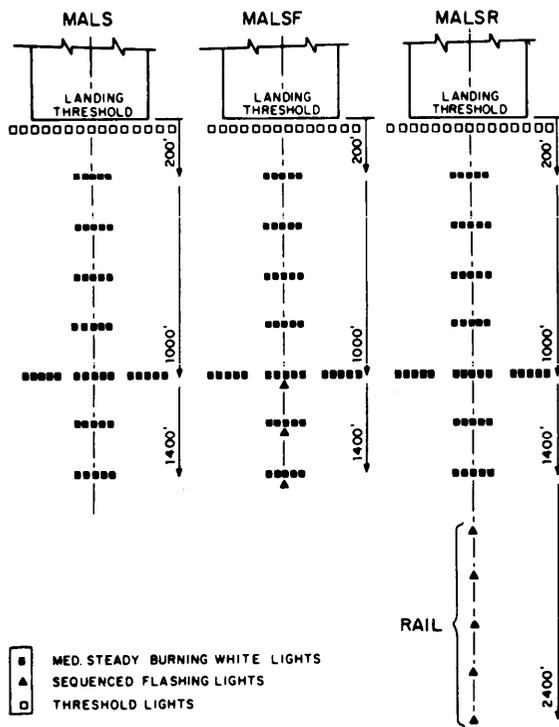


Figure 139. MEDIUM INTENSITY APPROACH LIGHTING SYSTEMS.

(2) **MALS/RAIL**. The MALS/RAIL consists of a MALS with three sequenced flashers located at the last three lightbar stations.

(3) **MALS/RAIL**. The RAIL portion of the MALS/RAIL consists of five or eight sequenced flashers located on the extended runway centerline. The first flasher is located 200 feet from the approach end of the MALS with successive units located at each 200-foot interval out to 2,400 feet from the runway threshold.

b. Equivalent Systems.

(1) **MALS and MALS/RAIL**. When the characteristics described in paragraphs 7a (1) and (2) exist in the systems shown in Figure 136, the appropriate visibility reductions may be applied to MILITARY instrument approach procedures.

(2) **MALS/RAIL**. When the characteristics described in paragraphs 7a (1) and (3) exist in the systems shown in Figure 138, the appropriate visibility reductions may be applied to MILITARY instrument approach procedures.

8. ODALS. Omnidirectional Approach Lighting System.

a. System Description. The system consists of seven strobe lights located in the approach area of a runway. Five of these strobes are located on the extended runway centerline starting 300 feet from the runway landing threshold and each 300-foot interval out to and including 1,500 feet from the threshold. The other two strobes are located on the sides of the runway threshold. The strobe lights flash in sequence toward the runway at a rate of once per second with the two units located at the runway end flashing simultaneously. The strobes have three intensity steps. See Figure 140.

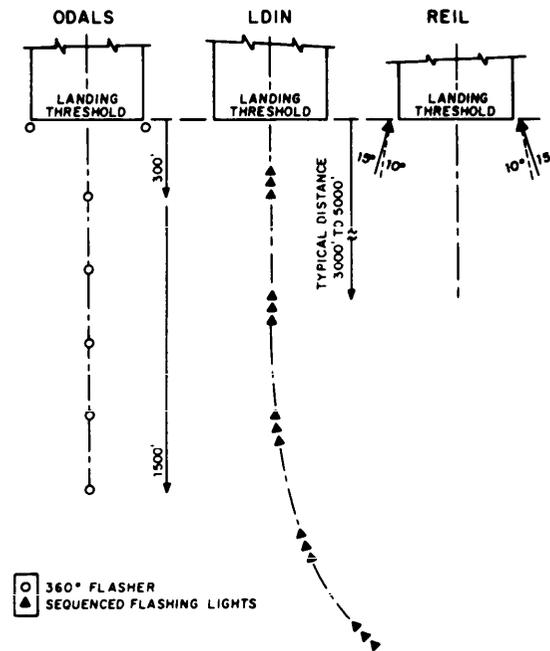


Figure 140. OMNIDIRECTION, LEAD-IN, AND RUNWAY END IDENTIFIER LIGHTING SYSTEMS

b. Equivalent Systems. When the characteristics described in paragraph 8a exist in the systems shown in Figure 141, the appropriate visibility reductions may be applied to MILITARY instrument approach procedures.

| | |
|---|--|
| * | Type Description |
| | BG Left Single Row (Canada) |
| | BR Centre Row RCAF (Canada) |
| | S Cross (Europe-Africa) |
| | M Single Row Centerline (Europe-Asia-South America) |
| | BF Centre Row RCAF (Canada) |
| | X Centerline, Two Crossbars (Europe-Africa) |

b. *Equivalent Systems.* The Hong Kong Curve (British), Type BE, is equivalent to the LDIN system. See Figure 142.

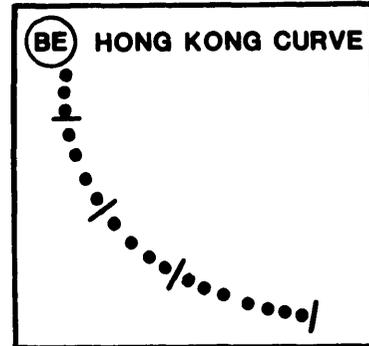


Figure 142. SYSTEM EQUIVALENT TO LDIN.

9. LDIN, Lead-In Lighting System.

a. *System Description.* The LDIN is usually installed as a supplement to a MALS or SSALS. This portion of the facility consists of a number of sequenced flashing lights beginning at a distance from the threshold determined by the need and terrain. These lights flash twice per second in sequence toward the threshold, have no intensity control, and operate on all brightness steps of the controlling system. The LDIN configuration is shown in Figure 140.

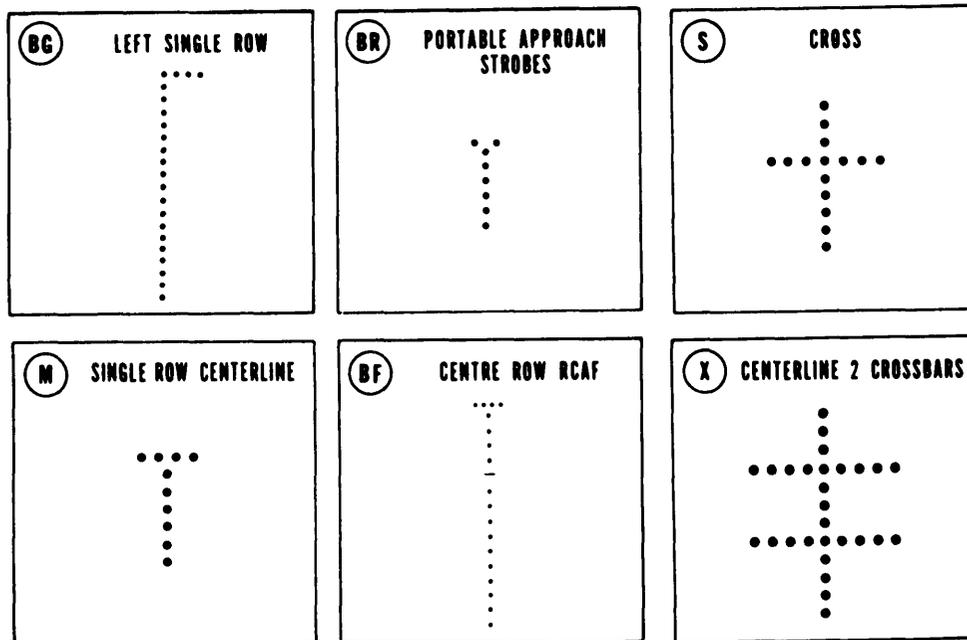


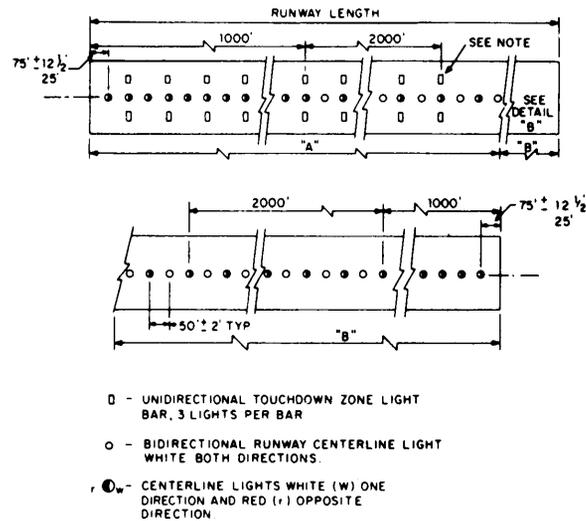
Figure 141. SYSTEMS EQUIVALENT TO U.S. ODALS paragraph 8, appendix 5.

* **10. REIL.** The Runway End Identifier Lights consist of a pair of condenser discharge fixtures identical to the sequenced flasher light system. The optimum location for the fixtures is at the runway threshold, 40 feet out on each side, measured from the runway edge. See Figure 140.

11. HIRL. High Intensity Runway Lights are used to outline the edges of paved runways during periods of darkness and low visibility. The light units are elevated and equipped with lenses which project two main light beams. Standards for design, installation, and maintenance are found in AC-150/5340-24.

12. MIRL. Medium Intensity Runway Lights are elevated and omnidirectional fixtures, with clear lenses. They may be used to light paved runways or unpaved landing strips. Standards for design, installation, and maintenance may be found in AC-150/5340-24.

13. TDZ/CL. Runway Centerline and Touchdown Zone Lighting. This system consists of touchdown zone lights and runway centerline lights. In the touchdown zone, two rows of transverse lightbars are located symmetrically about the runway centerline. The bars are spaced longitudinally at 100-foot intervals. Each lightbar consists of three unidirectional lights facing the landing threshold. The rows of lightbars extend to a distance of 3,000 feet, or one-half the runway length for runways less than 6,000 feet, from the threshold with the first lightbar located 100 feet from the threshold. The runway centerline lighting system consists of bidirectional fixtures installed at 50-foot intervals along the entire length of the runway centerline. The last 3,000-foot portion of the lighting system is color coded to warn pilots of the impending runway end. Alternate red and white lights are installed as seen from 3,000 feet to 1,000 feet from the runway end, and red lights are installed in the last 1,000-foot portion. Installation details may be found in AC 150/5340-4C.



NOTE: The touchdown zone lightbars are not required to be located at the same stations as the centerline lights.

Figure 143. TOUCHDOWN ZONE CENTERLINE LIGHTS. *